

## Caesium Iodide (CsI)

## MATERIALS DATA

Caesium Iodide is grown by sealed ampoule Stockbarger techniques with ingots of approximately 70mm diameter. CsI is very soft and pliable.

**APPLICATIONS:** Caesium Iodide is the material with the deepest known IR transmission, and is sometimes used for components in the widest range spectrophotometers. An extremely soft material, Caesium Iodide is extremely difficult to polish, and so performance is compromised for range. Doped with Thallium, CsI(Tl) is a useful scintillator which emits at a wavelength that is a good match for Silicon photodiodes. Arrays of Caesium Iodide(Tl) are used in security imaging systems.

Transmission Range	0.25 to 55 $\mu$ m (1)
Refractive Index	1.73916 at 10 $\mu$ m (1)(2)
Reflection Loss	13.6% at 10 $\mu$ m
Absorption Coefficient	n/a
Reststrahlen Peak	145.8 $\mu$ m
dn/dT	-99.3 x 10 <sup>-6</sup> /°C (2)
dn/d $\mu$ = 0	6 $\mu$ m
Density	4.51 g/cc
Melting Point	621 °C
Thermal Conductivity	1.1 W m <sup>-1</sup> K <sup>-1</sup> at 298 K (3)
Thermal Expansion	48.3 x 10 <sup>-6</sup> K <sup>-1</sup> at 293 K (3)
Hardness	Knoop 20 with 200g indenter
Specific Heat Capacity	201 J Kg <sup>-1</sup> K <sup>-1</sup> (4)
Dielectric Constant	5.65 at 1 MHz
Youngs Modulus (E)	5.3 GPa
Shear Modulus (G)	6.24 GPa
Bulk Modulus (K)	12.67 GPa
Elastic Coefficients	C <sub>11</sub> =24.6 C <sub>12</sub> =6.7 C <sub>44</sub> =6.24
Apparent Elastic Limit	5.6 MPa (810psi)
Poisson Ratio	0.214
Solubility	44 g/100 g water at 0 °C
Molecular Weight	259.83
Class/Structure	Cubic CsCl, Pm3m, no cleavage, deforms

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(1) Handbook Optical Constants, ed Palik, V2, ISBN 0-12-544422-2

(2) Rodney, J.Opt.Soc.Am. V45, p987, 1955

(3) Combes et al, J.Opt.Soc.Am. V41, p215, 1951

(4) Kelly, Bureau of Mines Bulletin, No371, p51, 1934



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$\mu\text{m}$	No	$\mu\text{m}$	No	$\mu\text{m}$	No
0.5	1.8064	1.0	1.7572	2.0	1.7466
3.0	1.7440	4.0	1.7431	5.0	1.7424
6.0	1.7418	7.0	1.7412	8.0	1.7406
9.0	1.7399	10.0	1.7392	11.0	1.7384
12.0	1.7375	13.0	1.7365	14.0	1.7355
15.0	1.7344	16.0	1.7332	17.0	1.7319
18.0	1.7306	19.0	1.7291	20.0	1.7276
21.0	1.7260	22.0	1.7244	23.0	1.7226
24.0	1.7207	25.0	1.7188	26.0	1.7168
27.0	1.7147	28.0	1.7125	29.0	1.7101
30.0	1.7077	31.0	1.7052	32.0	1.7027
33.0	1.7000	34.0	1.6972	35.0	1.6943
36.0	1.6913	37.0	1.6882	38.0	1.6849
39.0	1.6816	40.0	1.6781	41.0	1.6746
42.0	1.6709	43.0	1.6671	44.0	1.6631
45.0	1.6591	46.0	1.6549	47.0	1.6505
48.0	1.6460	49.0	1.6414	50.0	1.6366

